2.4 Methodology for Identifying Habitat Associations of Species of Greatest Conservation Need

Numerous habitat classification systems have already been developed for Wisconsin. Rather than developing another classification system, an existing habitat classification system was selected for use in this planning process. The selected classification system is the Ecological Landscapes/natural communities habitat classification system described in Section 2.2.

One advantage of selecting this classification system was that work had already been done to identify ecological opportunities for sustaining natural communities by Ecological Landscape through protection, restoration, and/or management. This work was previously completed by the Ecosystem Management Planning Team (Wisconsin DNR 2004a). A description of the process used by the Ecosystem Management Planning Team and their results are provided on the following web site: http://dnr.wi.gov/landscapes/opportunity/ecoloppstable.pdf. The Ecosystem Management Planning Team did not previously identify ecological opportunities for aquatic community types. However, aquatic natural communities were addressed in this plan. DNR fishery researchers developed a classification system for aquatic communities and assigned ecological opportunities for the eight aquatic natural communities of Wisconsin; coldwater streams, coolwater streams, Lake Michigan, Lake Superior, impoundments/reservoirs, inland lakes, warmwater rivers, and warmwater streams. This analysis was conducted by using personal information and references such as Wisconsin Fishes 2000: Status and Distribution (Lyons et al. 1996) and *Patterns in the species composition of fish assemblages among Wisconsin streams* (Lyons 1996). This process used the same criteria the Ecosystem Management Planning Team used for terrestrial habitats. A determination was made as to whether each of the aquatic natural communities represents a major opportunity, an important opportunity, is and/or was present, or is and/or was absent in each Ecological Landscape. A description of these terms is provided in the following table (Table 2-28). A numeric score was assigned to each ecological opportunity to facilitate data analysis.

Table 2-28. Description of Terms Used to Define Opportunities for Protection, Restoration and/or Management of Natural Communities by Ecological Landscapes. [Adapted from *Ecological Landscapes of Wisconsin* (Wisconsin DNR 2004a).]

Ecological Opportunity	Score	Description
Major	3	A major opportunity for sustaining the natural community in the Ecological Landscape exists, either because many significant occurrences of the natural community have been recorded in the landscape or major restoration activities are likely to be successful maintaining the community's composition, structure, and ecological function over a longer period of time.
Important	2	Although the natural community does not occur extensively or commonly in the Ecological Landscape, one to several occurrences do occur and are important in sustaining the community in the state. In some cases, important opportunities may exist because the natural community may be restricted to just one or a few Ecological Landscapes within the state and there may be a lack of opportunities elsewhere.
Present	1	The natural community occurs in the Ecological Landscape, but better management opportunities appear to exist in other parts of the state.
Absent	0	The natural community is and/or was not known to occur in the Ecological Landscape.

Vertebrate Species Teams provided the relative probability of occurrence of each of the vertebrate Species of Greatest Conservation Need in each of the 16 Ecological Landscapes of Wisconsin. Species were evaluated based on their probability of occurrence within each Ecological Landscape. It is critical to note that the probability of occurrence that was assigned to each species within an Ecological Landscape

represents the relative probability of that species to occur within the respective Ecological Landscape. It does not provide information regarding the distribution of that species within the Ecological Landscape. A description of the four probabilities used is provided in the following table (Table 2-29). A numeric score was assigned to each probability to facilitate data analysis. The probabilities and associated scores were assigned by the respective Species Team experts identified in Section 2.1 using literature sources, databases, communication with colleges, and personal knowledge. For example, species experts consulted the Natural Heritage Inventory Database (BIOTICS), Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004), U.S. Shorebird Conservation Plan (Brown et al. 2001), Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan (Kushlan et al. 2002), Wisconsin Fishes 2000: Status and Distribution (Lyons et al. 2000), Geographic distributions of the amphibians and reptiles of Wisconsin (Casper 1996), Mammals of Wisconsin (Jackson 1961), and Mammals of the Great Lakes Region (Kurta 1995). Additional literature sources consulted during the planning process are provided in the Bibliography of this document. A matrix displaying the Ecological Landscape probability of occurrence scores will be made available in CD format. These data may be obtained by contacting WDNR's Bureau of Endangered Resources at (608) 266-7012.

Table 2-29. Key to Probability of Occurrence Assigned to Vertebrate Species of Greatest Conservation Need.

Probability of Occurrence	Score	Description
High	3	Species is (and/or historically was) significantly associated with the Ecological Landscape, restoration of this Ecological Landscape would significantly improve conditions for the species.
Moderate	2	Species is (and/or historically was) moderately associated with the Ecological Landscape, restoration of this Ecological Landscape would moderately improve conditions for the species.
Low	1	Species is (and/or historically was) only minimally associated with the Ecological Landscape, restoration of this Ecological Landscape would only minimally improve conditions for the species.
None	0	Species does not (and did not historically) use this Ecological Landscape.

Ecological Landscapes were chosen to represent species locations in the state because they allow the most effective application of the information in the Strategy. Coarse-level information on locations and distributions are known for all vertebrate Species of Greatest Conservation Need. However, there is considerable variation among species in the degree to which ranges and occurrence locations are known. For some, existing occurrence information, mostly contained in the Natural Heritage Inventory Database (BIOTICS), the Wisconsin Breeding Bird Atlas (Wisconsin Society for Ornithology 2005), or the Geographic distributions of the amphibians and reptiles of Wisconsin (Casper 1996), is relatively comprehensive and range maps could be drawn with considerable certainty. However, for most of the vertebrate Species of Greatest Conservation Need, recent inventory is lacking and, more importantly, the availability of critical habitat plays a major role in where species are likely to occur. Because the distribution of habitats is the primary factor separating and distinguishing one Ecological Landscape from another, and since the Ecological Landscapes split the state into 16 relatively small sections, we believe it makes more sense to evaluate species distributions based on broader ecological themes. As such, the description of the locations of the Species of Greatest Conservation Need, though based on published species ranges and known occurrences, is best represented by Ecological Landscape.

Vertebrate Species Teams also provided the level of association between each of the vertebrate Species of Greatest Conservation Need and the 66 natural communities of Wisconsin. Surrogate prairie grasslands (sometimes referred to as surrogate grasslands) were included in this analysis. This "artificial natural community" was added to capture this community-level critical habitat for some vertebrate Species of

Greatest Conservation Need (e.g., Henslow's sparrow and surrogate prairie grasslands) that would not otherwise be noted.

Species were evaluated based on their level of association with each natural community. It is critical to note that the level of association that was assigned to each species-natural community combination represents the relative level of association of that species with the respective natural community. A description of the four levels of association is provided in the following table (Table 2-30). A numeric score was assigned to each of the levels of association to facilitate data analysis. The level of association and associated scores were assigned by the respective Species Team experts identified in Section 2.1 using literature sources, databases, communication with colleges, and personal knowledge. For example, species experts consulted the Natural Heritage Inventory Database (BIOTICS), Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004), U.S. Shorebird Conservation Plan (Brown et al. 2001), Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan (Kushlan et al. 2002), Wisconsin Fishes 2000: Status and Distribution (Lyons et al. 2000), Geographic distributions of the amphibians and reptiles of Wisconsin (Casper 1996), Mammals of Wisconsin (Jackson 1961), and Mammals of the Great Lakes Region (Kurta 1995). Additional literature sources consulted during the planning process are provided in the Bibliography of this document. A matrix displaying the natural community association scores will be made available in CD format. These data may be obtained by contacting WDNR's Bureau of Endangered Resources at (608) 266-7012.

Table 2-30. Key to Natural Community Associations Assigned to Vertebrate Species of Greatest Conservation Need.

Level of Association	Score	Description
Significant	3	Species is (and/or historically was) significantly associated with the natural community, restoration of this natural community would significantly improve conditions for the species.
Moderate	2	Species is (and/or historically was) moderately associated with this natural community, restoration of this natural community would moderately improve conditions for the species.
Minimal	1	Species is (and/or historically was) only minimally associated with this natural community, restoration of this the natural community would only minimally improve conditions for the species.
Absent	0	Species does not (and did not historically) use this natural community.

The majority of species included in the habitat assessment were evaluated based on all life history requirements. However, several species were evaluated based on only one life history phase. This was done because it was determined that certain species may have a greater dependency on (a) specific natural community type(s)/Ecological Landscape(s) during distinct phases of their life cycle. Species that use different habitats to complete their life cycle to differing degrees were evaluated based on the most limiting life history requirement. These species were evaluated on either breeding, wintering, or migration habitat. For example, Le Conte's sparrow was evaluated based on its relationship with Ecological Landscapes and natural communities during its breeding phase only. Life history requirements on which species were ranked are provided in the natural community association and Ecological Landscape probability of occurrence assessment matrices that can be obtained by contacting WDNR's Bureau of Endangered Resources at (608) 266-7012.

Specific habitat requirements of individual vertebrate species were also collected and recorded. This was done in order to capture those microclimates and niche requirements of species that would not be adequately captured in tables or matrices, but would need to be considered during development of conservation actions. As much as possible, use of standard terminology was encouraged during the development of specific habitat requirement descriptions.

The Ecological Landscape and natural community relationship data for vertebrate Species of Greatest Conservation Need were examined to determine the relationships between Species of Greatest Conservation Need and their habitats. The results are presented within the Assessment and Conservation Strategies Chapter (Chapter 3).

A number of different analyses of the Species of Greatest Conservation Need-Ecological Landscape-natural community association data were conducted. For example, each species' probability of occurrence within each of the 16 Ecological Landscapes (high, moderate, low, or none) was evaluated. These results were used to generate a map that was included in each respective vertebrate Species of Greatest Conservation Need species summary (Section 3.1.2.3, 3.1.3.3, 3.1.4.3, and 3.1.5.3). These maps display species' probability of occurrence by varying color intensity. It must be noted that these maps do not show the boundaries of the known or historic ranges of vertebrate Species of Greatest Conservation Need. As previously discussed, sufficient data do not exist in a format that would allow for the timely production of scientifically defensible Wisconsin range maps for all of the vertebrate Species of Greatest Conservation Need. These maps do provide a visual representation of the probability of occurrence for the species in question for any location within that Ecological Landscape. For example, the corresponding map for the western worm snake highlights the entire Western Coulee and Ridges Ecological Landscape. However, this species has only been observed in the western half of Grant County.

To determine which natural communities are most important to a vertebrate Species of Greatest Conservation Need, a more complex analysis was conducted. This analysis summed natural community association and Ecological Landscape probability of occurrence scores for each species with the Ecological Landscape opportunity score for each community-landscape combination in which that species occurs. This summary statistic was termed ecological priority. For example, red-headed woodpecker is significantly associated with oak openings (natural community association = 3) and has a high probability of occurring in the Southeast Glacial Plains (Ecological Landscape probability of occurrence score = 3). Though oak openings are no longer extensive in the Southeast Glacial Plains, they remain important ecological opportunities for protection and/or management (Ecological Landscape opportunity score = 2). The ecological priority score for red-headed woodpecker in oak openings of the Southeast Glacial Plains is therefore 8. Red-headed woodpecker also has a high probability of occurring in the Western Prairie Ecological Landscape, but in this landscape there remain greater ecological opportunities for protection and/or management of oak openings (Ecological Landscape opportunity score = 3). The ecological priority score for red-headed woodpecker in oak openings of the Western Prairie is therefore 9, higher than in the Southeast Glacial Plains.

The highest scoring ecological priorities for each species are displayed in the table "Landscape-community Combinations of Highest Ecological Priority" in each species summary. At least 10 of the highest scoring landscape-community combinations are listed for each species. More than 10 landscape-community combinations are listed when there were "ties" between numerous landscape-community combinations. For example, if a species had 10 ecological priority scores of 9, those would be the ecological priorities listed. However, if a species had 5 ecological priority scores of 9 and 15 ecological priority scores of 8, 20 ecological priorities were listed.

Species that are habitat generalists occur in many natural communities in most Ecological Landscapes. As a result, these species may exhibit more than one hundred community-landscape combinations. The ecological priority score allows for the rapid determination of which natural communities in which Ecological Landscapes of Wisconsin represent our greatest opportunities to conserve the most important habitat for a Species of Greatest Conservation Need. This is a relative measure that is not meant for comparison between species. This score does not consider socio-economical factors that may dictate protection and/or management priorities differently than those determined solely by ecological analysis.

Further, a low ecological priority score does not imply that management or preservation should not occur on a site if there are important reasons for doing so locally.